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Color quantization and processing by Fibonacci latti

Mojsilovic, A.   Soljanin, E.
IBM Thomas J. Watson Res. Center, Hawthorne, NY , USA;
This paper appears in: **Image Processing, IEEE Transactions on**

Abstract:
Color quantization is sampling of three-dimensional (3-D) color spaces (such
Lab) which results in a discrete subset of colors known as a color codebook or
is extensively used for display, transfer, and storage of natural images in Inte
applications, computer graphics, and animation. We propose a sampling scher
provides a uniform quantization of the Lab space. The idea is based on severa
from number theory and phyllotaxy. The sampling algorithm is very much sys
allows easy design of universal (image-independent) color codebooks for a giv
parameters. The codebook structure allows fast quantization and ordered dith
images. The display quality of images quantized by the proposed color codeb
comparable with that of image-dependent quantizers. Most importantly, the q
images are more amenable to the type of processing used for grayscale ones.
for processing grayscale images cannot be simply extended to color images b
rely on the fact that each gray-level is described by a single number and the 1
relation of full order can be easily established on the set of those numbers. Cc
(such as RGB or Lab) are, on the other hand, 3-D. The proposed color quantiz
color space sampling and numbering of sampled points, makes methods for p
grayscale images extendible to color images. We illustrate possible processing
images by first introducing the basic average and difference operations and tf
implementing edge detection and compression of color quantized images

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Index Terms:
· edge detection   image coding   image colour analysis   image sampling   lattice theor\

lattices   Internet-based applications   Lab space   animation   average operations   cc
structure   color codebook   color processing   color quantization   color quantized ima
compression   computer graphics   difference operations   display quality   edge detecl
images   number theory   ordered dither   palette   phyllotaxy   quantization   quantize
sampled points   sampling algorithm   sampling scheme   three-dimensional color spac
quantization   universal color codebooks

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